Title: Prevalence of Dental Caries and Associated Factors among 12 Years Old Students in Eritrea

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Author’s response to reviews:

Jose Leopoldo Ferreira Antunes, PhD (Reviewer 1): This study assessed the prevalence of caries in a sample of schoolchildren in Eritrea. Authors should be commended for having attempted to fill this gap in the literature, without funding for research. The theme is relevant for dental public health; the text is well written and reads smoothly. This reviewer considers this report to be a provisional documentation of dental disease in this country.

The main problem with the study is the sample design. Sample size estimation used the formula for random sampling. The number of individuals is clearly insufficient and the formula used to calculate this number is not applicable because the sample was planned to follow a multistage design.

Furthermore, the multistage sampling also adopted inappropriate methodological options:

Thank you for the comment. The number of respondents is clearly insufficient to represent the whole 12 year old population of Eritrea. However, the primary objective of the study is focused on assessing the prevalence of dental caries and related factors using a representative sample of the two purposely selected schools. So the significance of this study is to shed light or provide preliminary information on caries prevalence within the study setting of these two schools (or the
communities they represent). This is discussed as a study scope and limitation in the last part of the discussion part (paragraph 5), also see sample size estimation section

- Authors have not informed which towns were encompassed. Are the sample related to Asmara?

Thank you for the comment. The study does not identify specific towns encompassed but rather the towns are represented with the schools selected from the two strata, (rural and urban). The implicit assumption here is that data related to each school is assumed to reflect the situation of the community nearby the school (i.e school found in the urban would reflect situation of the children residing in the urban area and school found in the rural represent the rural condition). This is described in the sampling design line 1-6

- If there were 16 subzones in the central region, exclusively choosing two schools is obviously insufficient to complete a multistage sampling.

Thank you for the comment. The two subzones were selected purposely, considering the financial and administrative constraints. The selected schools within each subzone were chosen using simple random sampling method (the schools to provide reflections of the communities they represent). Therefore, the total sample size is representative of the population for the two schools, but not representative of the 16 sub zones. The explanation for this is given in methodology, sampling design section line 1-8

With an insufficient number of participating schools and children, the resulting sample cannot be considered representative of any wider setting. I would strongly recommend authors to correct the explanation of the sample design. A convenience sample was obtained for ease of access. This convenience sample included two schools (one at an urban area, the other at the rural zone) and 225 children. Results reported here do not allow for inferences for the whole country or any of its regions. Nothing more than this can be ascertained about the sampling design.

Thank you for the comment. Again, the sampled schools and study participants are not representative of the whole country but they do give a preliminary idea of the situation. This is particularly important because there is no apparently very significant difference in population demographics, health behavior or dietary differences in the community in which this study is conducted. However, nationwide study with sufficient funding would certainly be essential to have better epidemiological evidence. The scope and limitations are provided in discussion section last paragraph.
Raquel Antoniazzi (Reviewer 2): This cross-sectional study assess the prevalence and associated factors of dental caries among 12 years old school children in Eritrea. Using a sample of 225 twelve years old students, the authors found that the prevalence of dental caries, mean DMFT and SiC scores were higher when compared with the average score of developing countries. Further insights into the text should be provided for better understanding as follow:

1. Title: I suggest removing the study's design from the title: "Prevalence of dental caries and associated factors among 12 year old students in Eritrea"

Thank you for the comment. The title of the study is now changed to “Prevalence of dental caries and associated factors among 12 year old students in Eritrea.”

2. Background: Page 3, Line 47: Clarify the meaning of "MDGs"

Thank you for the comment. “MDGs” refers to Millennium Development Goals proposed by the United Nations in 2000. Goals number 4, 5 and 6 indicate for reducing child mortality, improving maternal health and combating HIV/AIDS, Malaria, and other Diseases respectively. This is mentioned in background section paragraph 5 line 1-4.

3. Background: Page 4, Line 17: The objective of the background does not describe the assessment of factors associated with dental caries as the title.

Thank you for this comment. The objective is now rewritten in background section paragraph 8 line 1-5.

4. Sampling design: Page 4, Line 41: Explain better how students were selected randomly in the subzones and in the schools.

Thank you for this comment. The subzones (Urban and rural setting) were selected purposely and the Students were selected by simple random sampling by calling their names and participate in the study after verbal consent. This is described in sampling design section line 1-11.

5. Data collection procedure: Page 5, Line 4: Specify which questionnaire was used? Clearly define all outcomes, exposures, predictors and potential confounders.
The data collection tool that was utilized in this study was adopted from the “WHO’s Oral Health Surveys basic methods fifth edition (2013).” It has been translated to a local language and a standard checklist was used to assess the occurrence of caries. The explanation for this is presented in the “data collection procedure” section paragraph 2 line 1-2

Definitions for the DMFT and SiC are described in the “data collection procedure” section paragraph 3 line 1-9

6. Data analysis: Page 5, Line 18: The title describes the objective of assessing the prevalence of dental caries and associated factors. A multivariate analysis with adjustment for possible confounding variables should be performed.

Thank you for the comment. We have considered using regression analysis using variables like parent’s educational level, family socio economic status and other variables like religion and ethnicity. But the variables were too few for model building and some of the variables were difficult to collect as the students either did not know, remember or were not really sure about their family’s educational level/socio economic status, resulting in loss of data credibility and gross missing data. Some variables like religion and ethnicity were inappropriate for regression analysis because of population homogeneity (E.g more than 95% of the respondents were Christians/ Tigrinya ethnic group, which may lead to data dredging effect). Hence we chose to leave these variables and use descriptive statistics with the most important findings to elaborate the situation.

7. Discussion: Clarify better the limitations and the generalizability (external validity) of the study results.

Thank you for the comment. The scope and limitations of the study are now addressed at the last paragraph of the discussion part.

8. Conclusion: The conclusion can be better clarified according to the objectives of the study.

Thank you for the comment. We have made some modifications to this section. See “conclusion” section
CristianeMeiraMeiraAssunção, Ph.D (Reviewer 3): General comments:

The study put light on a serious dental health problem, in a developing country. The methodology is simple, and although presented small failures, did not take out the value of this epidemiologic data, for this country. The manuscript is well written, although a grammar review could improve it, the references are adequate.

I made the review of this paper, considering this it as a first important step to improve dental health in Eritheia. I hope the comments bellow could help the authors to improve this paper and also the methodology for future studies. A special attention to dietary and hygiene habits, access to fluoride water and dentifrices should be given in future researches.

Specific comments:

Abstract:

- Information about who were the examiners and their training are useful at Abstract too.

Thank you for the comment. We have included a brief description of the examiners and training in the abstract. See abstract, methods line 4-5

- Use at least 3 Mesh Terms as key words to improve the paper search at databases, you could put 'Dental Health Services' or 'Dental Health for Children' instead of 'Dental health utilization'.

Thank you for the comment. We have added “dental health services” and “dental health for children” to key words. See abstract, key words

Introduction:

- Background was well described, references adequate and recent. Thank you for the comment

- Please describe briefly the MDGs (write the full organization name) health goals numbers 4, 5 and 6, reported at text.

Thank you for the comment. “MDGs” refers to Millennium Development Goals proposed by the United Nations in 2000. Details are described in background section paragraph 5 line 2-4.
Materials and Methods:

- Is there any official data of how many students of 12 years old attempt to this region in Erithea? This information could be useful to evaluate how representative was the sample.

Thank you for the comment. As mentioned in the sampling design, since the study employed purposive sampling, the findings are not representative of the whole 12 year old student population in Eritrea but they do give a preliminary view of the current situation of the studied student population of the communities.

On the other hand, the sample size calculation is quite adequate, just 20% of losses (non-response rate) are more used than 5%. Thank you for the comment.

- The proportion between students from rural and urban area was maintained close to reality?

Thank you for the comment. The objective of selecting one school from an urban setting and the other from rural setting was not due to the settings are proportionally comparable but to give us insights in the difference and similarities of dental caries and its associated factors in the context of these settings.

- Data collection procedures: please clarify the training procedures made prior to examination to ensure the two examiners were qualified to perform the clinical examination and other data collection.

Thank you for the comment. The details are incorporated in “data collection procedure” section, paragraph 1 line 2-6

- Please describe better which data was collected, about dental appointments, dental pain, dental health services utilization. Was the children who answer these questions? Was used a structured questionnaire with these questions?

Thank you for the comment. All the data that you have mentioned is included in our study as they are part of WHO questionnaire (data collection tool we’ve used)-a standard guideline for conducting oral health studies, please see data collection procedure section paragraphs 2

- Considering the adoption of masks, gloves and sterilized materials, the anti-infection rules were adopted. Please rewrite the statement, to clarify the sterilization procedure was made prior to clinical examination, and also after.
Thank you for the comment. Sterilization procedure before clinical examination and after procedures followed is described in data collection procedures paragraph 4

Results:

- The tables are self-explanatory, there is no need to repeat prevalence data at text. Just add the statistic test used on each analysis on the bottom of each table. All text written before 'Previous experience of dental pain and utilization of dental health facility' could be deleted, the information is already at tables.

Thank you for the comment. The combination of table and text was arranged so that the readability and arrangement of the manuscript could be more easy and flexible.

- Is there any information about the dentifrice used? Is there any regulation that ensures that most of dentifrices should contain fluoride?

Thank you for the comment. 75% of the study participants brush their teeth using toothpaste. This is written in the results section “dental hygiene practice and tools utilized”. Currently there is no regulation which dictates the amount of fluoride level on water and dentifrices in Eritrea.

- Please explain better the local chew-stick used for dental hygiene, maybe a picture of it or with a child using could be interesting. Did the children use this chew-stick with any fluoride dentifrice? All participants who reported the use of toothbrush associate fluoride dentifrice?

Thank you for the comment. The local chew stick used by the respondents and the general population originates from different tree species including Oleaeuropea, Eucleaschimperi, Rumexnervoses, Cadabafarinosaamong others. Chew stick from these trees is prepared in a suitable design and it is used without any fluoride dentifrices. This information in now added under discussion section paragraph 2

Discussion:

- "...majority of the participants reported they clean their teeth unassisted which can substantiate the notion that the study participants were not cleaning their teeth effectively". At age of 12 it is expected that children will be able to clean their teeth by themselves. The
poor hygiene could be discussed using the gums problems related, utilization of others devices instead of toothbrush.

Thank for the comment. The central argument here is that if 12 year olds are capable to clean their teeth by themselves, then how come they have high occurrence of caries. It’s clear that there is a difference between doing something and doing it efficiently. So our intention is to illustrate that although the majority of them are cleaning their teeth unassisted, there is a gap in efficiently cleaning their teeth. Moreover, as the scope of our research was limited due to lack of funding we did not record the gum status, from which poor hygiene could be discussed.

- In Brazil, we have some laws about the obligation of fluoride content in water, and also in dentifrices. Is there any parameter that should be followed in Eritrea? The access to fluoride could be better discussed.

Thank for the comment. There are no regulations regarding fluoride content in water and in dentifrices to date in Eritrea.

Conclusions:

- There are some statements in conclusion that fit better at discussion section, as below: "Water source in both locations was below optimum fluoride level for protective effect against dental caries. The suboptimal water fluoride level along with the poor dental service utilization and unhealthy consumption of food items is presenting a big challenge to the children's dental health condition"

- Write the conclusion to fit with objectives, describing the high caries prevalence, low access to dental health care and fluoride.

Thank you for the comment. We have made modifications to this section. See “conclusion” section